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**The Role of Trans-Atlantic Defense Alliances in a Globalizing  
World**

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**by**

**Nayantara Hensel, Assistant Professor**

**Graduate School of Business & Public Policy**

**Naval Postgraduate School**

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## **Abstract**

The purpose of this analysis is to discuss the importance of linkages between US and European defense manufacturers with the emergence of the common global threat of terrorism, the greater price sensitivity of governments concerning weapons systems costs, and the shrinkage of defense budgets. The article discusses the reasons behind the formation of alliances between US and European defense contractors, examines several case studies of alliances, assesses some of the patterns in alliance formation, and analyzes the potential for trans-Atlantic alliances between defense contractors in the future.

**Keywords:** Defense manufacturers, weapons systems costs, formation of alliances.

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## About the Author

Dr. Nayantara Hensel has taught finance and economics at the Graduate School of Business and Public Policy at the US Naval Postgraduate School since 2004 and is a Research Associate for the Center for Defense Management Research. She received her B.A. (magna cum laude) from Harvard University where she was a member of Phi Beta Kappa. She received her M.A. and Ph.D from the Graduate School of Arts and Sciences at Harvard University in Business Economics (Applied Economics). She recently served as the Pentagon Scholar in Residence, attached to the Office of the Assistant Secretary of the Navy. Prior to joining the faculty at the US Naval Postgraduate School, Dr. Hensel served as a Senior Manager at Ernst & Young, LLP and the chief economist for one of its units, was a Post-Doctoral Research Fellow at the National Bureau of Economic Research, taught at Harvard University and the Stern School of Business at NYU, and was an economist at NERA (part of Marsh & McLennan). Dr. Hensel's recent research has examined the impact of consolidation in the defense industrial base, policy concerns in the recent tanker competition between Boeing and Northrop Grumman / EADS, the factors impacting personal discount rates for US Marine Corps personnel, the efficiency of IPO auctions, and economies of scale and density in the European and Japanese banking sectors. She has published over 19 articles and book chapters. Her most recent publications have been in *Business Economics*, the *International Journal of Managerial Finance*, the *Review of Financial Economics*, the *European Financial Management Journal*, the *Journal of Financial Transformation*, and *Harvard Business School Working Knowledge*. She is the Chair of the Financial Roundtable for the National Association of Business Economists (NABE) and is one of 34 elected members to NBEIC, which is a group composed of the top corporate economists in the US. Dr. Hensel has given seminars

at a number of institutions and has appeared on CNBC, Bloomberg Radio, and CNNMoney.

Nayantara Hensel  
Assistant Professor  
Graduate School of Business and Public Policy  
Naval Postgraduate School  
Monterey, CA 93943-5000  
Tel: 831-656-3542  
E-mail: [ndhensel@nps.edu](mailto:ndhensel@nps.edu)

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# **I. Introduction**

The landscape of the global defense industry in the post-Cold War period has changed in a number of ways. First, the emergence of the terrorist threat has transcended the boundaries of nation-states and has led to the emergence of allied forces requiring interoperability of equipment and synergistic compatibility in computer systems. Cooperation in research, development, and technology transfer between defense contractors from various countries is important to produce the best product at the lowest cost. Second, the defense spending gap between Europe and the US continues such that the US remains a lucrative market for both European and US defense contractors. Third, the US defense industry experienced significant consolidation during the 1990's, which, in turn, contributed to greater consolidation among European defense contractors to remain competitive globally. This has limited the number of possible partners for additional mergers or alliances on both sides of the Atlantic. Fourth, as weapons systems become increasingly complex, it can be cost effective to spread the research and development costs across different defense companies. Fifth, the trend toward globalization across industries and greater collaboration between companies in different countries has accelerated over the past twenty years.

Against this backdrop, there have been a number of studies across industries on mergers, as well as on alliances. Mergers have the benefit of leading to the formation of more permanent relationships between the merging companies. With the absorption of one company into another, there are greater opportunities for cost cutting in eliminating duplicative workforces and in reorganizing the corporate hierarchy to better internalize and reduce the transactions costs which would have been present in an arms-length relationship. The benefits of this absorption can also lead to substantive integration costs and cultural / communication difficulties, which can postpone or altogether eliminate the benefits of the merger. Mergers can have permanent or long-lasting effects on the market power of various companies, the ability of new firms to enter the industry, and market concentration levels. As a



consequence, the regulatory scrutiny from the antitrust authorities is important in concluding the deal.

When mergers occur between companies from different countries, the magnitude of the opportunities for benefits relative to the costs changes. Absorption costs for an international merger can increase relative to a domestic merger, especially if there are cultural or communication incompatibilities between the merging parties. The issue of which country loses jobs to the other country is often magnified by the popular press and government officials. Although the impact on market power and market concentration may be less with an international merger than a domestic merger because the definition of the relevant market is geographically larger, the regulatory review process can become more complicated since regulatory authorities from multiple countries are involved.

Alliances can often be a good alternative to mergers. The parties involved in the alliance can obtain some of the benefits of a merger—joint investments in R&D expenses and production equipment, knowledge transfer and technology transfer, and access to new markets. Alliances can be easier to disassemble than mergers because less integration of operations is required. As a result, integration costs are lower and the potential for cultural or communication clashes is less. Nevertheless, as discussed by Doz and Hamel (1998), in alliances in which generation of economies of scale is a motivation, the costs of exiting the alliance can be high due to the sunk costs of investment in equipment. Since alliances may lack the depth of integration found in mergers, there could be less of an incentive for parties to invest in relationship-specific assets and to produce the types of benefits and efficiencies that would be possible in a merger. Finally, although alliances may raise fewer regulatory concerns, the degree of technology transfer, etc., is still subject to review. Government officials can also protest ensuing job loss if combined production facilities from the alliance result in a loss of jobs in one country.

Alliances have become increasingly prevalent in a variety of industries; indeed, a number of studies on alliances have been cross-sectional, rather than focused on a specific industry, such as Yoshimi and Rangan (1995) and Liedtka (1998). The importance of global competition as an impetus for alliance formation is discussed in Yoshimo and Rangan (1995). Strategic alliances can even be a defensive strategy in that, as Gomez-Casseres (1994) discussed, as more alliances are formed, there are fewer possible partners available for firms that wish to form new alliances, and “strategic gridlock” can develop.

Alliances are helpful in the defense industry for several reasons. First, the R&D costs for development of a product can be high, which is why it is more cost effective not to duplicate efforts. Second, the primary buyers are governments, who are increasingly cash-constrained. Collaboration between companies can be more cost-effective and successful than the competition between many different companies to chase a few contracts. Third, firms benefit from each other's skills without paying the integration costs and financial costs of a merger, which can lead to a higher return on investment from the collaboration because the costs of the investment are lower. This article analyzes the reasons behind the formation of alliances between US and European defense contractors, examines several case studies of alliances, assesses some of the patterns in alliance formation, and discusses the potential for trans-Atlantic alliances in the future.

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## II. Motivations for Trans-Atlantic Ties

One of the primary reasons for further developing trans-Atlantic ties between US and European defense contractors was the need for more synergistic and interoperable equipment among NATO members. In 1999, Alfred G. Volkman, US Acting Deputy Under Secretary for Defense, noted,

The end of the Cold War, the break-up of the Soviet empire, the emerging power of rogue nations, and equally destabilizing geopolitical events are transforming our vision of the 21<sup>st</sup> century security needs and our NATO military strategy...In order to develop and field interoperable equipment, it is necessary that stronger transatlantic ties are forged...Governments would agree on common [military] requirements, then invite defense firms to form transatlantic competitive teams of their own choosing. (Sparaco, 1999)

Nevertheless, concerns over limitations on technology transfer on national security grounds between countries was one of the greatest stumbling blocks in deepening trans-Atlantic ties. Indeed, in 1999, General Jean-Yves Helmer, Director of the DGA French armaments agency, noted, "the US and Europe do not share identical [defense] concepts and [operational] requirements. Nevertheless, there is ample room for synergy, **on the condition** [bolding added] that know-how and technology can circulate freely" (Sparaco, 1999). Barriers on export licensing and the transfer of technology limited the development of transatlantic alliances in the late 1990's and early 2000's, but the *Declaration of Principles* signed by the US and the UK in February 2000 was an early step to greater joint research and development, coordination of technology transfer, military requirements, etc. Some argued, however, that, with the exception of the UK and Canada, the US had a lack of trust for most other countries, especially in terms of technology-transfer issues (Barrie & Taverna, 2002).

European defense firms were also attracted to the US market because its defense market was much larger than the defense market in Europe. For example, in 2002, the US budget was three times that of EU countries. As a result, the investments of European companies in the US were 10 times greater than the value

of US acquisitions in the European defense sector. In some sub-sectors of the defense market, the gap in spending and trade between the US and Europe was less. For example, Raytheon argued that in the areas on which the Thales Raytheon Systems focused—battlefield surveillance and command and control (C2) systems—there was less of a differential in spending (Barrie & Taverna, 2002). Consequently, the interest of the Europeans in the US defense market was driven both by disparities in spending, as well as by the perception that US R&D might drive the next generation of weapons systems such that an alliance would give European countries access to the technologies without having to fund their development themselves (Barrie & Taverna, 2002).

### **III. Historical Concerns over International Merger Activity Involving the US Defense Sector**

Mergers or acquisitions involving the US defense market have historically been problematic. Although there may have been benefits from the acquisition, Congressional representatives are often concerned about job loss, as well as the national security issues inherent in technology transfer. As discussed in Hensel (2008), the acquisition is often formally disallowed, or the foreign entrant withdraws its bid in anticipation that the acquisition will be blocked if it proceeds further.

Hensel (2008) discusses, as an example, the concerns over the acquisition of Fairchild Semiconductors by Fujitsu, a Japanese firm, in the US semiconductor industry in the 1980's. Fujitsu announced that it planned to purchase 80% of Fairchild Semiconductors, which was the second largest seller of chips to the US military. The US semiconductor industry was important for early warning, air-defense, and air-to-surface attack systems, naval surface warfare, tanks, and conventional artillery. Between 1978 and 1987, Japan had increased its share of the semiconductor industry from 28% to 50%, while the share of the US in semiconductors had fallen from 55% to 44%. For particular types of chips, such as DRAM chips, the share of US companies fell from 90% in 1975 to 5% by 1986. A Congressional outcry ensued following Fujitsu's proposal. Senator Howard Metzenbaum of Ohio argued that jobs would be lost, while B. Jay Cooper, the press secretary for the Department of Commerce, argued that the deal would place "vital national interests at stake." Several proposals were suggested, including a proposal that the merged firm would not be allowed to have military contracts and a proposal that Fairchild would not provide Fujitsu with military technology. The outcome of the protests was that in March 1987, Fujitsu withdrew its offer, and National Semiconductor bought Fairchild and became the sixth largest chipmaker in the world (Dallmeyer, 1987).

Hensel (2008) discusses a more recent example of a failed attempt at entering the US market, which occurred in 2005 in the US oil sector. As in the semiconductor case, the foreign acquirer withdrew its offer due to a substantive Congressional outcry. China National Overseas Oil Corporation (CNOOC), a Chinese state-owned company, tendered a bid to purchase Unocal Corp for \$18.5 billion. Chevron, the other bidder, was offering only \$17.1 billion, but it mobilized Congressional representatives to express their concerns about a Chinese firm playing a significant role in the US oil sector. In the wake of this outcry, CNOOC withdrew its bid even before the CFIUS review and Chevron acquired Unocal (Shearer, 2006).

Hensel (2008) notes that concerns over national security can lead to some form of separation or divestiture of operating units linked to the defense sector so that the rest of the acquisition can proceed. One recent example, discussed in her article, is the merger of Alcatel (a French firm) and Lucent Technologies. Since Bell Labs, a division of Lucent, had undertaken a number of projects for the US government, Bell Labs would be insulated from the new firm and would become a separate US subsidiary with an independent board. A second example, discussed in her article, was the concern over the acquisition of Peninsula & Orient Steam Navigation Co. (P&O), a British firm, by the state-owned Dubai Ports Worldwide (DPW). This acquisition provoked a Congressional outcry because it would have resulted in a foreign company managing 6 US ports. DPW agreed to sell the ports to a US company in the wake of strong Congressional opposition (Lynch, 2006; "Buy America," 2006; Shearer, 2006).

Hensel (2008), however, describes how the US is not the only country that uses protectionism to block mergers. For example, Dominique de Villepin, who served as the French Premier, designated 11 sectors of the French economy as sensitive for national security, and blocked the merger of PepsiCo (US) and Danone (French) under "economic patriotism." He further encouraged the merger of Gaz de France (a French gas supplier with significant state involvement) with Suez (a French power and water supplier) at the expense of a bid by the Italian company

Enel. Similarly, Italy has blocked foreign takeovers of many of its banks (Pearlstein, 2006; Platt, 2006; Beattie, 2008). As globalization exposes vulnerabilities, it is likely that countries will continue to promote domestic champions by preventing foreign acquisitions through protectionist concerns linked to national security.



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#### **IV. Patterns in Alliances between US Defense Contractors and Foreign Defense Contractors**

Alliances between US defense firms and foreign firms are also exposed to some of the same concerns as mergers, such as concerns over the potential of US jobs going overseas and national security concerns over technology transfer. Nevertheless, although alliances undergo some scrutiny, it can be easier for the parties involved in the alliance to limit the degree of their involvement with each other, at least initially, than would be the case in a merger. As the alliance deepens and trust is built, both between the two parties concerned and between the two governments involved in the alliance, the degree of involvement can increase.

Butler, Kenny, and Anchor (2000) discuss strategic alliances within the European defense industry, as well as many of the changes to the defense sector. They describe how certain defense sub-sectors have more alliances than others, and note that the electronics sector, the land vehicles sector, and the naval vessel sector have more alliances than the small arms and ordnance sector. Although they do not discuss why this might be the case, one possibility is that the sectors with more alliances are more R&D intensive, and it is more cost effective for the partners to share the costs than to bear the costs alone. They also discuss how cultural compatibility has not been necessary for the success of defense alliances, although 70% of UK contractors are in an alliance with a US firm. They find that many of the alliances are actually agreements for sub-contracting, where the US firm is the lead contractor, or licensing agreements, where the US firm is the licensor.

This author collected data on the number, type and details of joint ventures and alliances between 2002 and 2005 involving US defense contractors with other US defense contractors, as well as with foreign defense contractors. Her analysis of the data found that Lockheed Martin and Boeing had the greatest number of alliances with foreign defense contractors. Northrop Grumman, General Dynamics, and Raytheon had between 1/4 and 1/3 of the number of alliances with foreign

contractors as Lockheed Martin and between 1/2 and 1/3 of the number of alliances with foreign contractors as Boeing. The fact that Boeing and Lockheed Martin had more alliances with foreign defense contractors during this period than other large US defense contractors may be a function of: (a) the opportunities for shared R&D in the weapons systems sub-sectors in which these alliances focused, as well as (b) the success of previous alliances made by these companies, which made them more likely to be willing to enter into additional alliances, creating a positive, self-reinforcing cycle.

In further examining the data, the author divided the foreign defense contractors involved in alliances with a US defense contractor by region—Europe, the UK / Australia / Canada, Asia, and the Middle East. Lockheed Martin contracted half of its alliances and joint ventures involving foreign contractors with UK, Australian and Canadian contractors and the other half with Asian contractors. Northrop Grumman contracted 2/3 of its foreign alliances with UK, Australian, and Canadian contractors, and 1/3 with Middle Eastern contractors. General Dynamics contracted 1/2 of its foreign alliances with European contractors and half with UK, Australian, or Canadian contractors. Raytheon had 100% of its foreign alliances with European contractors. Boeing had 1/3 of its foreign alliances with European contractors and 2/3 with Asian contractors. Lockheed Martin and Northrop Grumman did not form an alliance with a European contractor at all during this period, while Raytheon and Boeing, which did form alliances with European contractors, did not form any alliances with UK, Australian, or Canadian contractors over this period. The dominance of UK, Australian, Canadian, or European firms as foreign partners in these alliances suggests the importance of: (a) common language; (b) geographic proximity; (c) a prior history of successful alliances with firms in that country, leading to a positive, self-reinforcing cycle; and (d) the importance of these partner countries as allies in the Global War on Terror and the need for interoperability of equipment, especially in joint operations.



## **V. The Role of Alliances in Creating Additional Alliances among Competitors: A Case Study of the CFM Alliance and International Aero Engines**

Alliances are often formed in order to combine different knowledge pools to create a new and superior product. As the market share for this product increases, the competitors in this product space may also form alliances to share knowledge and to develop an even better product than their allied competitors. The result of this defensive alliance formation can be an improved market sector, with several innovative and competing products for the end-user, developed by multiple competing alliances. The development of the CFM International alliance and the International Aero Engine alliance is an example of this.

CFM International is a joint venture between Snecma, formerly a French state-owned enterprise, and General Electric (GE). The alliance, which is one of the most successful and long-lasting alliances in the trans-Atlantic market, was formed in 1974 because GE and Snecma intended to leverage their skills developed in the engine market in the defense sector by entering the civilian market for engines, which was heavily dominated by Pratt & Whitney at the time. One of the initial hurdles was to convince the US government to allow GE to share its military technology with Snecma. As of 2007, the engines made by CFM (especially the CFM 56 engine) could be found in over 50% of the fleet of single aisle planes with 100 seats or more and are often found in Airbus 320's and Boeing 737's. The way in which the alliance was structured was that each of the two partners would be involved with the design, production, and research of their respective modules / components within the engine. GE and Snecma's relationship has not been based on equity holdings. The two firms split the proceeds from the engines in half, based on notional costs, although neither company knows the true costs of its partner ("Business: Odd Couple," 2007).

During the early 1980's, Pratt & Whitney's market share began to fall in this product space. In 1983, it created the International Aero Engines (IAE) alliance with MTU (part of Daimler-Benz), Fiat, Rolls-Royce, and Japanese Aero Engines to develop an engine which would compete with CFM's engines ("Business: Odd Couple," 2007). This product alliance, like CFM International, was based around the design of an engine—in this case, the V2500 engine.

By 1995, CFM International and International Aero Engines controlled 26.6% of the aero engine sector. One benefit of the alliances within the civil engine arena has been that, although Rolls Royce, Pratt & Whitney, and GE were already involved in the civil engine market, the other members of the alliances, such as Snecma, through its development of the CFM56 engine with the CFM International alliance, and Daimler-Benz, through its development of the V2500 engine as part of the International Aero Engines alliance, were able to enhance and establish their positions in this market. The creation of the CFM International alliance allowed Snecma, which had manufactured jets for the French military, to use this expertise to enter the civilian aero engine market and to build up a significant presence through its development of the CFM56 engine. Consequently, by galvanizing Pratt & Whitney and other manufacturers to form International Aero Engines, alliance formation facilitated the development of several new engines, as well as a vibrant, competitive marketplace for the end-user (Smith, 1997).

## **VI. Trans-Atlantic Partnerships as a Means of Promoting National Defense Strategy: A Case Study of Trans-Atlantic Cooperation in Missile Defense**

In 2002, Boeing entered into separate agreements at the Farnborough Air Show with BAE, EADS, and Alenia Spazio to cooperate on ballistic missile defense. The alliance planned to be an informational exchange in which Boeing would discuss with its European partners its approach to missile defense, and they would discuss the technologies that they could incorporate in the missiles (Asker, Barrie, & Taverna, 2002). Part of the purpose of the agreements was to galvanize the interest of European governments in larger ballistic missile defense programs, which they thought could be destabilizing, rather than just theater-wide missile defense. It could help the US convince the Europeans that larger missile defense programs could also cover NATO's European members and to show the Europeans that there would be jobs involved in it ("Business: Hands Across the Sea," 2002).

The various European partners in the alliance were chosen due to the contributions that their expertise would provide to the project. Alenia Spazio, part of Finnmeccanica, would add their expertise in supercomputers / data fusion, synthetic aperture radar satellites, and wideband secure telecommunications to the joint missile defense architecture discussions. EADS would add expertise in the space area from its affiliate, Astrium, as well as its knowledge of early warning satellite systems, which could locate the sites where the ballistic missiles were launched, the zone of potential impact, and the trajectory of the missile in the boost phase (Asker, Barrie, & Taverna, 2002).

Part of the reason why there was an impetus for transatlantic alliances in the missile area is that there have been several previous alliances in the missile product area.

For example, Boeing and EADS had collaborated on a study for NATO on tactical missile defenses (Asker, Barrie, and & Taverna, 2002), and Boeing had worked in marketing the Meteor missile, made by EADS and BAE. Most of the previous arrangements between Boeing and EADS had involved subcontracting or marketing, while this alliance involved sharing the product development responsibilities ("Business: Hands Across the Sea," 2002).

Consequently, this alliance was partially motivated by the need to convince the Europeans on the US perspective toward larger missile defense programs. It involved sharing of knowledge between the members and a fusion of their different capabilities to produce innovative products. Alliances, particularly between Boeing and EADS, had previously existed in the missile defense arena, and the positive momentum from these previous alliances had helped in building trust and, thus, helped to promote the development of subsequent alliances.



## **VII. Alliances Focused on Specific Product Areas: A Case Study on the Alliance between Raytheon and Thales**

Many of the successful trans-Atlantic alliances between defense contractors have been focused on a specific product area. CFM International and International Aero Engines, discussed in section V, are examples of successful alliances which concentrated on developing systems in a specific product area. Another example of this type of alliance is the alliance between Thales (formerly Thomson-CSF, a French company) and Raytheon. This alliance, Thales Raytheon Systems, was completed in early 2001. This alliance was created so that the two contractors could collaborate on ground-based battlefield radar programs and air defense command / control (C2) programs (Taverna, 2001). By the end of 2001, Thales and Raytheon had collaborated on 17 projects ("US-Euro Strategic Alliances," 2001).

The alliance was a horizontal combination in which firewalls were built to protect against leakage of sensitive information. Thales Raytheon Systems was divided into two subsidiaries, in which Raytheon would have a 51% share in the US subsidiary, and Thales would have a 51% share in the European subsidiary. The revenues of Thales Raytheon Systems were split between France and the US (Taverna, 2001).

As was the case in the alliance formed between Boeing and EADS in the missile defense area, Thales Raytheon Systems was formed partially because the two companies involved had successfully collaborated on other fronts, thus building trust between the two parties and increasing their tendency to invest in relationship-specific assets, despite the more arms-length nature of an alliance relative to a merger. Thales and Raytheon collaborated on the Air Command Systems

International (ACSI), which was a venture established in 1997 to work on the Florako air defense radar project in Switzerland, and NATO's Airborne Command and Control System (LOC1). ACSI continued to be a separate entity, but was attached to Thales Raytheon Systems (Taverna, 2001).

## **VIII. The Role of Alliances in Sharing R&D Costs: A Case Study of Boeing's "Super-Jumbo" Jet Alliance**

Mergers and alliances are often valuable in enabling the participating firms to generate economies of scale in both R&D costs and in production costs by sharing these costs or by spreading them over a greater number of units of output to lower per unit costs. As weapons systems have become more complex, R&D has continued to be an important and costly phase of the product development cycle.

One example of an alliance which was formed to share R&D costs was an alliance, led by Boeing, and including the Airbus companies of Aerospatiale SA (France), British Aerospace, and Daimler-Benz, to develop a "super-jumbo" jet. The R&D costs to develop this jet, which would have carried between 600 and 800 passengers, were \$15 billion. This was too much for one contractor to sustain, and was more affordable when spread over an alliance of contractors (Cole, 1995).

The project first began development in January 1992, but collapsed in 1995 due to uncertainty in demand. Only Singapore Airlines and British Airways were willing to place orders. This underscores the importance of the need to share R&D costs, and hence the risk of product development, in an environment of uncertain demand. A second reason for the collapse of the project was the concern that it would consume so much capital that it would limit the development of the next generation of supersonic planes (Cole, 1995). Consequently, although alliances are important in sharing R&D costs, the placement of the product being developed has to be evaluated in the context of the costs of the estimated future trajectory in product development.

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## **IX. The Role of Alliances in Developing Interoperable Equipment between Allied Forces: A Case Study of the Joint Strike Fighter**

The development of the Joint Strike Fighter (JSF) is an example of one of the most extensive alliances in the defense sector, involving 9 different contractors from various countries, led by Lockheed Martin. The JSF not only allows the various contractors to contribute their expertise to provide a better product, but also provides a strong basis for understanding the challenges facing global defense alliances in the future, ranging from cost allocation issues, to technology transfer security issues, to global supply chain integration issues.

One of the main benefits of the creation of the JSF is that the new product, created by the sharing of technology between the various allied nations, will allow greater synchronization of subsequent operations of the coalition of allied countries and the development of more similar capabilities. The intention has been for the F-35 to replace 13 different types of aircraft across 11 different countries ("Lockheed Martin," 2008). Nine nations are participating in the JSF program, according to their levels of financial involvement. While the US is the primary customer, the UK is a Level I partner since it contributes 10% of the development costs, followed by Level II partners (the Netherlands and Italy), and then followed by Level III partners (Canada, Turkey, Australia, Norway, and Denmark) ("F-35 Lighting II," 2009).

The international structure of the relationships between the US contractors and the foreign contractors on the JSF has drawn criticism. By mid 2003, one of the concerns was linked to the fact that the foreign contractors on the JSF did not have to share the growing development costs, which had already increased \$3 billion since the start of the system development phase. The US defense representatives argued that they could ask for assistance from their foreign allies in handling cost overruns. A second concern, voiced by the chairman of the House Government

Reform Panel, Representative Shays, was that too many US jobs on the JSF were going overseas—as of that point, 18% of the contracts on the JSF had gone overseas, valued at \$2.2 billion. A third concern came from the partners on the other side of the Atlantic: the Chairman of Alenia Aeronautica noted his disappointment in the return on investment in the JSF. On the US side, there were concerns that program decisions might have to be made to increase the return on investment to partner countries, but which could also lead to delays or higher costs (Wall, 2003). Finally, a fifth concern arose surrounding technology transfer issues. The UK threatened to exit the JSF program unless the US shared information on the stealth technologies, etc., related to the plane (“Politics and Economics,” 2006). Britain had invested \$2 billion in the plane as of the spring of 2006, when the discussions began about their concerns over the US not sharing this technology (“Strains in the Alliance,” 2006). This disagreement was subsequently resolved.

Multinational military operations require a degree of synergy between the technology of the various allied powers, and compatibility in computer systems and communications systems is important. Trans-Atlantic alliances can promote this, not only in the case of the JSF, but also for subsequent products. The intention of Secretary of Defense Robert Gates, as announced in April 2009, to purchase more JSPs emphasizes the commitment of the US to systems which are compatible with its allies and which are developed through global alliances, as well as the high quality of the collaboratively produced plane.

## **X. The Role of Alliances in Entering New Markets: A Case Study of the Northrop-Grumman / EADS Alliance on the KC-45a Tanker**

One of the most recent chapters in the evolution of trans-Atlantic defense relations has been the alliance between Northrop Grumman and EADS to supply the USAF with a new fleet of aerial refueling tankers. This contract may be the largest defense contract in history with the exception of the F-35 Joint Strike Fighter. This is a landmark case not only in terms of the size of the defense contract, but also in terms of the relationship of the US with the broader European defense market, and the impact of the US reaction to the tanker competition on global perceptions concerning the openness of the US defense market.

As discussed in Hensel (2008), the tanker competition is very important to the USAF because the average age of the existing KC-135 tankers is 47 years, and the planes were first put into service in 1957. The 2008 competition was initially over a \$1.5 billion contract, covering 4 test aircraft. The intent was then to buy 175 more planes, for a total value of \$35 billion. While the \$35 billion amount would stretch over 10-15 years, an additional \$60 billion in revenue could come from maintenance and parts such that the overall contract would be worth \$100 billion (“Analysts,” 2009; “Northrop group,” 2008; Wolf & Shalal-Esa, 2008; Hinton, 2008).

Hensel (2008) discusses how, in this competition, Boeing displayed the behavior of a traditional incumbent. It had been the provider of refueling tankers to the USAF for almost 50 years and had what was often referred to as a “monopoly.” When the Air Force announced that the Northrop Grumman / EADS team had won the contract on February 29, 2008, Boeing indicated shortly afterward that it was dissatisfied with the decision and lodged a series of protests with the GAO about the way in which the competition was conducted. The GAO recommended that the competition be reopened and upheld 8 of Boeing’s 100 protests, although they

stated that they found no evidence of “intentional wrongdoing” by USAF procurement officials (Randolph, 2008).

The USAF announced on July 9, 2008 that it would reopen the competition and would focus it on the 8 areas of protest sustained by the GAO. Unlike the previous competition, which was overseen by the USAF, this competition would be overseen by John Young, the chief of weapons procurement and the Undersecretary of Defense for Acquisition, Technology, and Logistics at the Pentagon. The Air Force stated explicitly that in the new competition, it would provide extra credit for a larger plane with additional fuel offload capacity (Shalal-Esa, 2008, July 9). Boeing, faced with the opportunity to propose the larger 777 in light of this “extra credit” suggested in the draft RFP, claimed that it would pull out of the competition if it were not provided with more time to develop a modified 777. The USAF decided to cancel the competition in the fall of 2008 and to re-open it again under the new Presidential administration. The last chapter in this story remains to be written.

The alliance of Northrop-Grumman and EADS to build aerial refueling tankers differed from previous trans-Atlantic alliances due to the substantive investment that EADS planned to make in the US defense industrial base, both in terms of creating jobs and in terms of building production facilities. This was because it wanted to obtain a stronger base within the US to enter the US market, as well as to protect itself from currency fluctuations, which had hurt it in 2008. It pays suppliers in euros, but sells airliners in dollars, so moving production to dollar-zone countries was particularly helpful when the euro was strong relative to the dollar. About 60% of the Northrop / EADS tanker would be made in the United States. Some of the parts would be manufactured in Germany, France, Spain, and Great Britain, but assembly of the tanker would have occurred in Mobile, AL, where EADS planned to build the third largest manufacturing facility in the world and where it had also planned to assemble a commercial freighter version of the A330 (Wolf & Shalal-Esa, 2008).

Unfortunately, as extensively discussed in Hensel (2008), the Congressional representatives from the states which would have benefitted if Boeing had received



the contract, protested strongly that US jobs would be lost under the Northrop / EADS proposal. Despite the fact that the Northrop / EADS tanker would create 48,000 jobs in the US, Kansas Representative Tiahrt continued to argue ““I cannot believe we would create French jobs in place of Kansas jobs”” (Drawbaugh, 2008, February 29). On the other hand, Senator McCain noted, ““I’ve never believed that defense programs should be—that the major reason for them should be to create jobs. I’ve always felt that the best thing to do is to create the best weapon system we can at cost to taxpayers”” (Drawbaugh, 2008, March 3). These thoughts were echoed in the comments of Pentagon acquisition chief John Young, who noted, ““I don’t think anybody wants to run the department as a jobs program,”” further arguing that lawmakers usually focused on asking him to reduce the costs of weapons systems (Shalal-Esa, 2008, March 4).

As analyzed in Hensel (2008), the initial award of the contract to the team of Northrop / EADS reinforced the perception of many that, as Defense Secretary Robert Gates had stated, “defense manufacturing is a global business” (“Northrop,” 2008), particularly as the US had allied with many other countries in combating the War on Terror. Many perceived this initial award as the harvest of improved relations with France, and that it would be much harder for European manufacturers to claim that US markets were closed to them. French President Nicholas Sarkozy stated on March 3, 2008 ““If Germany and France had not shown from the beginning that we were friends and allies of the United States, would it have been possible to have such a commercial victory?”” (Hepher, 2008). Nevertheless, after the GAO handed down its ruling, several European officials expressed concerns that this signaled that US markets were not open to European products, despite the investment of the European alliance partner in the US defense industrial base. Others expressed concerns of retaliation on the part of European manufacturers if Northrop / EADS finally loses the contract when the competition is re-opened.

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## **XI. Conclusion**

The purpose of this analysis is to discuss the importance of linkages between US and European defense manufacturers with the emergence of the common global threat of terrorism, the greater price sensitivity of governments concerning weapons systems costs, and the shrinkage of defense budgets. Due to national security concerns and integration costs, alliances can often be easier to develop than mergers and can provide a prelude to an ultimate merger between the parties if the alliance is successful. They can provide many of the benefits of mergers, such as sharing R&D costs or allowing access into new markets, without many of the costs of mergers—difficulty in exiting, substantive integration costs, etc.

The case studies in this analysis highlighted the role of trans-Atlantic alliances in achieving various outcomes—spurring alliances between competitors to ultimately create a market with several new products (CFM International and International Aero Engines), promoting national defense strategies (Boeing's alliance with EADS and other manufacturers in the missile arena), sharing R&D costs (the failed alliance between Boeing and other manufacturers to build a “super-jumbo” jet), developing interoperable equipment between allied nations (the JSF), and entering new markets (the alliance between Northrop Grumman / EADS to supply new aerial refueling tankers).

The last two cases—the JSF and the tanker competition—will have a significant impact on subsequent trans-Atlantic defense alliances. The JSF, because it unites manufacturers from 9 countries, will break new ground and set new precedents in how issues involving global supply chain problems, cost absorption, and technology transfer will be resolved in later trans-Atlantic alliances. The tanker competition, both due to the magnitude of the contract, the size of EADS' proposed investment in the US, and the international publicity that the competition achieved from the dialogues of various Congressional representatives and government leaders, will affect perceptions about the openness of US markets to foreign manufacturers.

As countries are increasingly faced with budgetary strains from combating the current financial crisis, the fiscal strains imposed by an ageing population, and other areas such as education, infrastructure, etc., defense budgets will likely be under more pressure. Moreover, there will be a greater emphasis on obtaining innovative weapons systems products at low costs and in a timely manner. As supply chain issues are smoothed out, there will be a significant opportunity for global alliances in the defense sector to play a valuable role in helping governments meet the challenges of the new millennium.



## List of References

- Analysts assess damage to Boeing in aftermath of contract loss. (2009, March 3). *Marketwatch*.
- Asker, James R., Barrie, D., & Taverna, M.A. (2002, July 29). US, European firms join on missile defense. *Aviation Week and Space Technology*.
- Barrie, D., & Taverna, M.A. (2002, July 22). Allure of Pentagon purse sustains European interest. *Aviation Week and Space Technology*.
- Beattie, A. (2008, May 5). US issues warning on stoking protectionism. *Financial Times*.
- Business: Hands across the sea: Defense alliances. (2002, July 27). *The Economist*.
- Business: Odd Couple; Jet Engines. (2007, May 5). *The Economist*, p. 72.
- Butler, C., Kenny, B., & Anchor, J. (2000) Strategic alliances in the European defense industry. *European Business Review*, 12 (6), 308-322.
- Buy America. (2006, April 15). *Government Executive*.
- Cole, J. (1995, July 10). Boeing-led alliance halts "super-jumbo" jet. *Wall Street Journal*.
- Dallmeyer, D. (1987, November/December). National Security and the semiconductor industry. *Technology Review*, 47-55.
- Doz, Y., & Hamel, G. (1998). *Alliance advantage: The art of creating value through partnering*. Boston: Harvard Business School Press.
- Drawbaugh, K. (2008, February 29). Congress in turmoil over Air Force tanker decision. *Reuters*.
- Drawbaugh, K. (2008, March 3). U.S. Congress roiled by Air Force tanker decision. *Reuters*.
- F-35 Lightning II. *Wikipedia*. Retrieved April 12, 2009, from <http://en.wikipedia.org>
- Gomez-Casseres, B. (1994, July/August). Group versus group: How alliance networks compete. *Harvard Business Review*, 72(4).

- Hensel, N. (2008, October). Globalization and the US defense industrial base: A case study of the tanker competition between Boeing and Northrop Grumman/EADS. *Business Economics*, 43(4), 40-51.
- Hepher, T. (2008, March 3). Eads shares soar after big US defense deal. *Reuters*.
- Hinton, C. (2008, March 11). Boeing files protest over the Air Force tanker award. *Marketwatch*.
- Liedtka, J.M. (1998). Synergy revisited: How a "screwball buzzword" can be good for the bottom line. *Business Strategy Review*, 9(2), 45-55.
- Lockheed Martin Aeronautics Company: F-35: Delivering on the promise to redefine national strategic capabilities. (2008, October 4). *Economics and Business Week*
- Lynch, D.J. (2006, March 15). Some would like to build a wall around the US economy. *USA Today*.
- Northrop group wins \$35B Air Force deal. (2008, February 29). *CNNMoney.com*.
- Northrop Grumman fires back on tanker debate. (2008, March 5). *CNBC.com*.
- Platt, G. (2006, May). Cross-border acquisitions facing growing interference from tighter security reviews. *Global Finance*.
- Pearlstein, S. (2006, March 1). Ports furor is just protectionism, with a French accent. *Washington Post*.
- Politics and economics: US, UK are likely to end clash that's marred fighter jet project. (2006, December 12). *Wall Street Journal*.
- Randolph, M. (2008, July 21). Top acquisition official: Tanker acquisition top priority. *Air Force Print News Today*
- Smith, D.J. (1997). Strategic alliances in the aerospace industry: A case of Europe emerging or converging? *European Business Review*. 97(4).
- Shalal-Esa, A. (2008, March 4). Air Force agrees to brief Boeing on tanker loss. *Reuters*.
- Shalal-Esa, A. (2008, July 9). U.S. plans expedited rerun of aerial tanker contest. *Reuters*.
- Shalal-Esa, A., & Wolf, J. (2008, July 9). Pentagon reopening contest to build aerial tankers. *Reuters*.

- Shearer, B. (2006, May). Raising barriers to inbound deals. *Mergers and Acquisitions*
- Sparaco, P. (1999, April 26). Security concerns impede alliances. *Aviation Week and Space Technology*
- Strains in the alliance. (2006, April 10). *Time*.
- US-Euro strategic alliances will outpace company mergers. (2001, December 3). *Aviation Week and Space Technology*
- Taverna, M.A. (2001, January 1). Raytheon, Thales form defense venture. *Aviation Week and Space Technology*
- Wall, R. (2003, July 28). Fear. *Aviation Week and Space Technology*
- Wallace, J. (2008, August 7). Boeing air tanker bid takes hit. *Seattle Post-Intelligencer*.
- Wolf, J., & Shalal-Esa, A. (2008, March 2). Northrop-Eads beats Boeing to build US tanker. *Reuters*.
- Yoshimo, M., & Rangan, U. (1995) *Strategic alliances: An entrepreneurial approach*. Boston: Harvard Business School Press.

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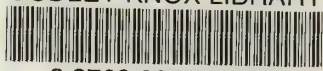
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